

RT/duroid® 6006/6010LM High Frequency Laminates



RT/duroid® 6006/6010LM microwave laminates are ceramic-PTFE composites designed for electronic and microwave circuit applications requiring a high dielectric constant. RT/duroid 6006 laminate is available with a dielectric constant value of 6.15 and RT/duroid 6010LM laminate has a dielectric constant of 10.2.

RT/duroid 6006/6010LM microwave laminates feature ease of fabrication and stability in use. They have tight dielectric constant and thickness control, low moisture absorption, and good thermal mechanical stability.

RT/duroid 6006/6010LM laminates are supplied clad both sides with 1/2 oz. to 2 oz./ft² (18 to 70 µm) standard and reverse treated electrodeposited copper foil. Thick aluminum, brass, or copper plate on one side may be specified.

Standard tolerance dielectric thicknesses of 0.010", 0.025", 0.050", 0.075", and 0.100" (0.254, 0.635, 1.270, 1.905, 2.54 mm) are available. When ordering RT/duroid 6006 and RT/duroid 6010LM laminates, it is important to specify dielectric thickness and weight of copper foil required.

Data Sheet



Features and benefits:

- High dielectric constant for circuit size reduction
- Low loss. Ideal for operating at X-band or below
- Low Z-axis expansion for RT/duroid 6010LM. Provides reliable plated through holes in multilayer boards
- Low moisture absorption for RT/duroid 6010LM. Reduces effects of moisture on electrical loss
- Tight ϵ_r and thickness control for repeatable circuit performance

Some Typical Applications:

- Patch Antennas
- Satellite Communications Systems
- Power Amplifiers
- Aircraft Collision Avoidance Systems
- Ground Radar Warning Systems

TYPICAL VALUES						
PROPERTY	RT/duroid 6006	RT/duroid 6010.2LM	DIRECTION	UNITS	CONDITIONS	TEST METHOD
[2]Dielectric Constant ϵ_r Process	6.15 ± 0.15	10.2 ± 0.25	Z		10 GHz 23°C	IPC-TM-650 2.5.5.5 Clamped stripline
[3]Dielectric Constant ϵ_r Design	6.45	10.7	Z		8 GHz - 40 GHz	Differential Phase Length Method
Dissipation Factor, tan δ	0.0027	0.0023	Z		10 GHz/A	IPC-TM-650 2.5.5.5
Thermal Coefficient of ϵ_r	-410	-425	Z	ppm/°C	-50 to 170°C	IPC-TM-650 2.5.5.5
Surface Resistivity	7X10 ⁷	5X10 ⁶		Mohm	A	IPC 2.5.17.1
Volume Resistivity	2X10 ⁷	5X10 ⁵		Mohm•cm	A	IPC 2.5.17.1
Youngs' Modulus						
under tension	627 (91) 517 (75)	931 (135) 559 (81)	X Y	MPa (kpsi)	A	ASTM D638 (0.1/min. strain rate)
ultimate stress	20 (2.8) 17 (2.5)	17 (2.4) 13 (1.9)	X Y	MPa (kpsi)	A	
ultimate strain	12 to 13 4 to 6	9 to 15 7 to 14	X Y	%	A	
Youngs' Modulus						
under compression	1069 (155)	2144 (311)	Z	MPa (kpsi)	A	ASTM D695 (0.05/min. strain rate)
ultimate stress	54 (7.9)	47 (6.9)	Z	MPa (kpsi)	A	
ultimate strain	33	25	Z	%		
Flexural Modulus						
	2634 (382) 1951 (283)	4364 (633) 3751 (544)	X	MPa (kpsi)	A	ASTM D790
ultimate stress	38 (5.5)	36 (5.2) 32 (4.4)	X Y	MPa (kpsi)	A	
Deformation under load	0.33 2.10	0.26 1.37	Z Z	%	24 hr/ 50°C/ 7MPa 24 hr/ 150°C/ 7 MPa	ASTM D261
Moisture Absorption	0.05	0.01		%	D48/50°C, 0.050" (1.27mm) thick	IPC-TM-650, 2.6.2.1
Density	2.7	3.1		g/cm ³		ASTM D792
Thermal Conductivity	0.49	0.86		W/m/°K	80°C	ASTM C518
Thermal Expansion	47 34, 117	24 24,47	X Y,Z	ppm/°C	0 to 100°C	ASTM 3386 (5K/min)
Td	500	500		°C TGA		ASTM D3850
Specific Heat	0.97 (0.231)	1.00 (0.239)		J/g/K (BTU/lb/°F)		Calculated
Copper Peel	14.3 (2.5)	12.3 (2.1)		pli (N/mm)	after solder float	IPC-TM-650 2.4.8
Flammability Rating	V-0	V-0				UL94
Lead-Free Process Compatible	Yes	Yes				

[1] SI unit given first with other frequently used units in parentheses.

[2] Dielectric constant is based on .025 dielectric thickness, one ounce electrodeposited copper on two sides.

[3] The design Dk is an average number from several different tested lots of material and on the most common thickness/s. If more detailed information is required, please contact Rogers Corporation.

Refer to Rogers' technical paper "Dielectric Properties of High Frequency Materials" available at <http://www.rogerscorp.com/acs>.

Typical values are a representation of an average value for the population of the property. For specification values contact Rogers Corporation.

Standard Thickness	Standard Panel Size	Standard Copper Cladding	Non-Standard Copper Cladding
0.005" (0.127mm) 0.010" (0.254mm) 0.025" (0.635mm) 0.050" (1.27mm) 0.075" (1.90mm) 0.100" (2.50mm) Non-standard thicknesses available	10" X 10" (254mm X 254mm) 10" X 20" (254mm X 508mm) 18" X 12" (457mm X 305mm)* Non-standard panel sizes 20" X 20" (508mm X 508mm) 18" X 24" (457 X 610 mm)* *note: the above 2 panel sizes are only available >0.025" thickness	½ oz (18 µm) and 1 oz (35µm) electrodeposited copper foil	½ oz (18 µm), 1 oz (35µm) and 2 oz. (70µm) reverse treated copper foil 2 oz. (70µm) electrodeposited copper foil
Thick metal claddings may be available based on dielectric and plate thickness. Contact customer service for more information on available non-standard and custom thicknesses, claddings and panel sizes.			

The information in this data sheet is intended to assist you in designing with Rogers' circuit materials. It is not intended to and does not create any warranties express or implied, including any warranty of merchantability or fitness for a particular purpose or that the results shown on this data sheet will be achieved by a user for a particular purpose. The user should determine the suitability of Rogers' circuit materials for each application.

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Advanced Connectivity Solutions

100 S. Roosevelt Avenue, Chandler, AZ 85226

Tel: 480-961-1382 Fax: 480-961-4533 www.rogerscorp.com